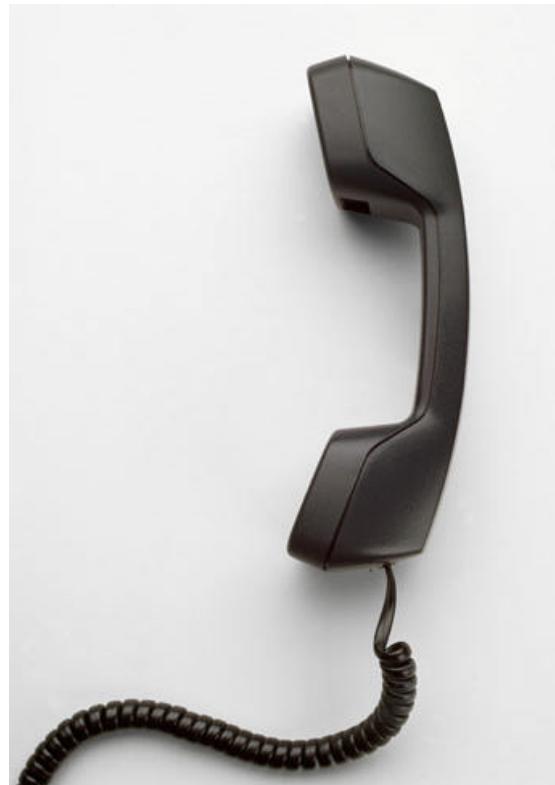


Telework and Emergency Management: A New Understanding of Handling Business Interruption



Detailed Data Supplement

Table of Contents

<u>TABLE OF CONTENTS</u>	2
<u>INTERVIEWS</u>	3
<u>SURVEY</u>	5
<i>General Information</i>	5
<i>Question 1</i>	7
<i>Question 2</i>	7
<i>Question 3</i>	8
<i>Question 4</i>	8
<i>Question 5</i>	9
<i>Question 6</i>	10
<i>Question 7</i>	11
<i>Question 8</i>	11
<i>Question 9</i>	12
<i>Question 10</i>	13
<i>Question 11</i>	14
<i>Question 12</i>	16
<i>Question 13</i>	16
<i>Question 14</i>	16
<i>Question 15</i>	17
<i>Question 16</i>	17
<i>Question 17</i>	17
<i>Question 18</i>	18
<i>Questions 28, 29 and 30</i>	19
<i>Question 31</i>	19

Interviews

I asked three of my interview participants, Jack Nilles, Patricia Mokhtarian and Rick Tobin, specific questions about the pilot project of the State of California and what should be done today regarding telework and emergency management.

Jack Nilles thinks the strengths of the pilot project were the fact that it was sufficiently large to get statistical significance out of the results and the fact that it ran long enough to dispel Hawthorne effect arguments. Another positive aspect was that it included a wide variety of people from almost 20 different agencies.

A weakness was that not very many clerical level workers were involved, most participants were managers or professionals. The pilot project also did not include any telework centers, which is another disadvantage. Jack would have liked to have follow-ups to the pilot project on a three year basis. Unfortunately, no roll-out plan regarding what happens after the pilot project was implemented. "The biggest problem with many of these projects is just that the demonstration works fine but the follow up just phh."

Since the pilot project ended, the number of teleworkers has risen, but has not increased as much as it should have according to Jack. One of the reasons for this is the fact that telework does not have the high-level backing it requires.

To the question what specifically needs to be done, Jack answered that the governor needs to say, let's do it. It has been demonstrated that telework can happen successfully, what is needed are incentives, such as a (moral or financial) reward system, to make it happen.

As a specific idea, Jack suggests a State Telework Week with a prize for the agency that has the highest proportion of its staff telecommuting that week. He calls for something visible that gets PR, an annual prize with a built in effect on the compensation of mid-level and senior managers.

Patricia Mokhtarian thinks that systematic data should be collected about teleworking among government employees. This would not only be an advantage from the academic point of view but would also reveal to employers the dynamics of teleworking over time.

She thinks the way to go in California is to provide lots of support, PR, case studies and reduce the uncertainty of management. She points out that it should not be forced upon people who absolutely do not want to do it.

To the question what specifically needs to be done she answered: "Do it!"

Rick Tobin suggests forming a consortium, a working agreement between groups that have a like interest in mind and a like mission. "We need businesses in the private sector to influence workers and business people and government people to set up a program for disaster operations for their workers using

telework as an option.” He calls for a videotape or a television show on emergency management.

Survey

General Information

The following California Government Agencies were selected:

1	Alcohol and Drug Programs, Department of
2	Business, Transportation and Housing Agency
3	Community Services and Development, Department of
4	Conservation Corps, California
5	Consumer Affairs, Department of
6	Corrections, Department of
7	Developmental Services, Department of
8	Educational Facilities Authority, California
9	Emergency Services, Office of
10	Employment Development Department
11	Energy Resources, Conservation and Development Commission
12	Environmental Health Hazard Assessment, Office of
13	Equalization, Board of
14	Fish and Game, Department of
15	Food and Agriculture, Department of
16	Franchise Tax Board
17	General Services, Department of; Real Estate Division
18	Health and Welfare Agency Data Center
19	Industrial Relations, Department of
20	Information Technology, Department of
21	Justice, Department of; Attorney General Legal Division
22	Library, California State
23	Military Department
24	Motor Vehicles, Department of
25	Native American Heritage Commission
26	Peace Officer Standards and Training
27	Public Defender, State
28	Public Employees Retirement System
29	Public Utilities Commission
30	Seismic Safety Commission
31	Social Services, Department of
32	State Controller
33	Trade and Commerce Agency, California
34	Transportation, Department of
35	Toxic Substances Control, Department of
36	Veterans Affairs, Department of

37	Water Resources Control Board, State
38	Youth Authority, Department of the
39	Youthful Offender Parole Board

Sample

<i>Group</i>	<i>Description</i>	<i># of selected agencies</i>	<i>%</i>
A	999 and fewer employees / without telework involvement	8	20.513
B	1000 and more employees / without telework involvement	9	23.077
		17	43.590
C	999 and fewer employees / with telework involvement	11	28.205
D	1000 and more employees / with telework involvement	11	28.205
		22	56.410
		39	100

Returned questionnaires

<i>Group</i>	<i>Description</i>	<i># of sent questionnaires</i>	<i># of returned questionnaires</i>	<i>%</i>
A	999 and fewer employees / without telework involvement	8	5	24
B	1000 and more employees / without telework involvement	9	3	14
C	999 and fewer employees / with telework involvement	11	7	33
D	1000 and more employees / with telework involvement	11	6	29
		39	21	100

Twenty-one questionnaires were returned by January 18, 2000. That is a return rate of 54%.

Question 1

How many employees of your agency are teleworking in a formal written telework agreement?

N=21

Answer	# of Answers	%
0	10	47.6
3	1	4.76
7	1	4.76
15	1	4.76
18	1	4.76
20	1	4.76
21	1	4.76
22	1	4.76
37	1	4.76
About 50	1	4.76
568	1	4.76
Unknown	1	4.76
	21	~100

Question 2

What is the average number of days per week the teleworking employees in your agency telework?

This question applies only to those that did not answer “0” in Question 1.

I specifically include in this question the respondent that answered “unknown” in Question 1. In Question 3 this respondent gives a date for the introduction of the formal telework option, so it can be concluded that this agency does have formal teleworkers, the respondent just does not know how many. That is the answer “no answer”.

N=11

Answer	# of Answers	%
1 day	4	36.36
2 days	4	36.36
3 days	1	9.09
4 days	1	9.09
No answer	1	9.09
	11	~100

Question 3

When was the formal telework options introduced (year, month)?

This question applies only to those that did not answer “0” in Question 1.

N=11

Answer	# of Answers	%
07/87	1	9.09
01/88	1	9.09
02/88	1	9.09
05/90	1	9.09
09/93	1	9.09
10/94	1	9.09
05/95	1	9.09
10/12/95	1	9.09
11/96	1	9.09
02/98	1	9.09
01/03/98	1	9.09
	11	~100

Question 4

How many employees were teleworking at the start of the formal telework program?

This question applies only to those that did not answer “0” in Question 1.

N=11

Answer	# of Answers	%
0	2	18.18
6	1	9.09
11	1	9.09
12	1	9.09
15	1	9.09
17	1	9.09
20	1	9.09
35	1	9.09
Unknown	2	18.18
	11	~100

Two respondents answered “0”. I believe they misunderstood the question. Naturally, before a formal telework program is conceived, there are no (“0”) teleworkers in an agency. What the question was aiming at, though, was with how many teleworkers the formal telework program was launched (as opposed to how many teleworkers do they have today).

Question 5

How many employees of your agency are teleworking on an informal basis, without a formal written agreement?

N=21

<i>Answer</i>	<i># of Answers</i>	<i>%</i>
0	7	33.32
1	1	4.76
3	1	4.76
4	1	4.76
5	1	4.76
10	1	4.76
15	1	4.76
15-20	1	4.76
30	1	4.76
94	1	4.76
100	1	4.76
hundreds	1	4.76
Unknown	3	14.28
	21	~100

The respondent that answered “30”, added the following text: “NOTE: Our “emergency support” mission requires us to be in constant contact by e-mail. In addition, most managers and office heads conduct work via connection to our file servers in both Intranet and Internet environments. It is “additional” work requirements and is not formalized in the sense of Teleworking procedures.”

<i>Group</i>	<i>Formal teleworkers</i>		<i>Informal teleworkers</i>	
	<i>yes</i>	<i>no</i>	<i>yes</i>	<i>no</i>
<i>A</i>	1	4	2	3
<i>B</i>	2	1	2	1
<i>C</i>	4	3	6	1
<i>D</i>	4	2	2 ¹	2

Question 6

What is the average number of days per week the teleworking employees in your agency telework?

This question applies only to those that did not answer “0” in Question 5. Of the three respondents who answered “unknown” in Question 5, I include only one in the answers to this question and the following two, Question 7 and 8. The reason for this is, that two of those that answered “unknown” did not answer Question 6 through 9. The third one (the same that answered “unknown” for Question 1), did not answer to Question 6, but did answer to Question 7 through 9. It can be concluded that there are informal teleworkers in that agency but the respondent does not know exact numbers.

N=12

<i>Answer</i>	<i># of Answers</i>	<i>%</i>
1 day	4	33.32
2 days	2	16.66
3 days	3	24.99
No answer	1	8.33
1 day per month	1	8.33
0.5 - 1 day	1	8.33
	12	~100

¹ Two respondents from group D answered the question asking for the number of informal teleworkers with “unknown” and “unable to determine”.

Question 7

When did teleworking on an informal basis start (month, year)?

N=12

<i>Answer</i>	<i># of Answers</i>	<i>%</i>
07/86	1	8.33
05/88	1	8.33
1991	1	8.33
10/93	1	8.33
11/96	1	8.33
01/03/98	1	8.33
06/98	1	8.33
08/98	1	8.33
Many years ago	1	8.33
Unknown	3	24.99
	12	~100

Question 8

How many employees were teleworking at the start of the informal teleworking?

N=12

<i>Answer</i>	<i># of Answers</i>	<i>%</i>
1	1	8.33
2	1	8.33
5	2	16.66
8	1	8.33
15	1	8.33
79	1	8.33
Not applicable	1	8.33
Unknown	4	33.32
	12	~100

One respondent answered “not applicable”. I believe they misunderstood the question (the same problem as with Question 4). This respondent indicated in Question 5 that there are informal teleworkers in this agency.

Question 9

What are the reasons for the informally teleworking employees not to be teleworking with a formal telework agreement?

More than one answer was possible.

N=12

<i>Answer</i>	<i># of Answers</i>
No necessity to formalize it	4
Do not want to formalize it	2
Do not know how to formalize it	1
Other (Please explain)	5
No answer	2

Other reasons respondents indicated were:

- "easier process when a teleworker is only teleworking on a project-specific basis"
- "is done on a case by case special circumstances and is infrequently used"
- "Generally, it is on a project basis. Increased productivity."
- "It was decided at the XX² that teleworking guidelines would be drawn up **per** Division/Branch. These guidelines would then apply to everyone within that Division/Branch with the determination of formal vs. informal agreements being left tot he discretion of each individual supervisor. Currently, at XX³ there is only 1 supervisor who requires a formal written agreement." (bold in original)
- "We are evolving away from informal teleworking, but still find it occasionally
- "The telework program was just implemented at XX⁴. Informal teleworkers have not had the opportunity to complete a formal agreement due to Y2K issues."
- "XX⁵ telecommute program is a formal agreement between the employee, supervisor and Division Chief."
- "Occasional or irregularly-scheduled on an as needed basis."

² To preserve anonymity, the name of the agency is not being given.

³ op.cit.

⁴ op.cit.

⁵ op.cit

Question 10

*What are the main reasons for teleworking in your agency?
(Please rank in order of importance with “1” being the most important, “2” the second most important, etc.)*

*Space savings
Improved recruitment/retention
Productivity increases
Improved customer service
Greater flexibility for employees
Risk management
Other (Please explain)*

15 respondents answered with a ranking as directed. Out of those, one respondent rated all seven answers, the others left some out. Only the rating ‘1’ (most important) and ‘2’ (second most important) were given by all 15 respondents. 5 respondents did not answer with a ranking but checked some items off. 1 respondent did not answer at all.

N=21

‘Most important’/‘1’		
<i>Answer</i>	<i># of Answers</i>	<i>%</i>
Not valid	6	28.56
Space savings	2	9.52
Improved recruitment/retention	0	0
Productivity increases	3	14.28
Improved customer service	0	0
Greater flexibility for employees	9	42.84
Risk management	0	0
Other (Please explain)	1	4.76
	21	~100

Other reasons respondents indicated were:

- “Executive Order by Governor and DPA⁶ requirement”

⁶ DPA = Department of Personnel Administration

N=21

‘Second most important’/’2’		
<i>Answer</i>	<i># of Answers</i>	<i>%</i>
Not valid	6	28.56
Space savings	1	4.76
Improved recruitment/retention	4	19.04
Productivity increases	4	19.04
Improved customer service	0	0
Greater flexibility for employees	5	23.8
Risk management	1	4.76
Other (Please explain)	1	4.76
	21	~100

Other reasons respondents indicated were:

- "Parking Considerations/Traffic"

Because not all respondents answered with a ranking ‘3’ through ‘7’ these answers are not taken into account. They do not reveal clear results.

Other reasons respondents indicated were:

- "to help alleviate traffic congestion in the San Francisco Bay Area" (rank 3)
- "Improve air quality and reduce traffic congestion" (rank 5)
- "Accommodation of medical restrictions were employees can perform some or all work functions while adhering to recommendation of physician." (no rank, but check mark)
- "Air quality compliance effort" (nothing checked, just added)
- "The XX⁷ telecommute program is offered to reduce commute congestion and improve productivity." (no rank, but check mark)
- "no employees current telework" (nothing checked, just added)
- "Air quality issues" (rank 2)

Question 11

*What are the main reasons that discourage teleworking in your agency?
(Please rank in order of importance with "1" being the most important, "2" the second most important, etc.)*

Never thought about it

Do not agree with the concept of telework

None of the tasks within the jobs are location-independent

Minority of the tasks within the jobs are location-independent

Do not know how to start it

Other (Please explain)

⁷ To preserve anonymity, the name of the agency is not being given.

Because not all respondents answered with a ranking from '2' through '6', these answers are not taken into account, as they do not reveal clear results.

Other reasons respondents indicated themselves were:

- "When staff is not "immediately" available, inter-divisional/branch cooperation on projects is often hampered. Also, with the increasing number of vacancies that cannot be filled, there is an increased workload (backlog) that requires quick turnaround. Additionally, within at least one division, management indicated that there was a demonstrable decline in work product." (rank 4)
- "Discourage is not quite the picture, formalized teleworking has not been seen as an alternative to our work environment; however, our Department is beginning to expand its work horizons and plan to present a Teleworking plan for adoption within the Department in the new year." (check mark)
- "We are still evaluating telework's benefit to XX⁸ & our constituents." (check mark)
- "We had trouble with the Union CSEA who blocked our implementation plans." (no mark, just added)

⁸ op.cit.

-
- "Does not apply. XX⁹ does not discourage teleworking. It had not been made available to employees until now." (no mark, just added)
 - "Security requirements for confidential files and costs to implement them." (no mark, just added)
 - "Fearful that employees would not be accessible, abuse of time, + physically would not be able to share information when physically separated." (no mark, just added)

Question 12

Does your agency have a Business Resumption Plan (BRP)?

N=21

Answer	# of Answers	%
Yes	17	80.92
No	3	14.28
No answer	1	4.76
	21	~100

Question 13

If yes, is telework included in your BRP?

This question applies only to those who answered "yes" in question 12.

N=17

Answer	# of Answers	%
Yes	9	52.92
No	8	47.04
	17	~100

Question 14

Does your agency have a Continuity Planning for Business (CPB)?

N=21

Answer	# of Answers	%
Yes	19	90.44
No	0	0
No answer	2	9.52
	21	~100

⁹ op.cit.

Question 15

If yes, is telework included in your CPB?

This question applies only to those who answered “yes” in question 14.

N=19

<i>Answer</i>	<i># of Answers</i>	<i>%</i>
Yes	10	52,632
No	9	47,368
	19	~100

Question 16

Does your agency have an Operational Recovery Plan (ORP)?

N=21

<i>Answer</i>	<i># of Answers</i>	<i>%</i>
Yes	18	85.68
No	1	4.76
No answer	2	9.52
	21	~100

Question 17

If yes, is telework included in your ORP?

This question applies only to those who answered “yes” in question 16.

N=18

<i>Answer</i>	<i># of Answers</i>	<i>%</i>
Yes	10	55.5
No	7	38.85
	18	~100

Question 18

Did any event, emergency or disaster in the past 10 years

- *make your building unusable, and/or*
- *prevent or disable employees from reaching their regular work site and/or*
- *impair in any other way physical access to and/or usage of the regular work site?*

N=21

<i>Answer</i>	<i># of Answers</i>	<i>%</i>
Yes	5	23.8
No	13	61.88
No answer	3	14.28
	21	~100

5 respondents answered “yes” to this question and therefore the Questions 19 through 27 also applied to them.

As the answers vary greatly, I am presenting them in a text format for each questionnaire.

The first agency experienced two fires in its building, which caused air quality problems in July and December 1998. The recovery process took a minimal number of days. The damage to supplies in the building was significant. Access into building lobby was limited. Approximately 20 employees of this agency were teleworking formally before these events occurred. Approximately 10 employees were teleworking informally immediately after and/or in recovery of these events. This teleworking arrangement was terminated after the recovery process was completed.

The second agency experienced a fire alarm threat, a bomb threat and an electrical outage in December 1998. The recovery process took a few hours. No damage was experienced, apart from a few unproductive hours. Employees of this agency were teleworking (none formally and one informally) before this event occurred.

The questions about the number of employees teleworking immediately after/and or in recovery of the emergency and if this teleworking arrangement was continued, expanded or terminated after the recovery process was completed were not answered.

The third agency experienced a water pipe burst, small fire and possible asbestos spill at various points in time during the past ten years. The recovery process was an unspecified number of days (as opposed to months or years). The damage this agency experienced was water and equipment damage. Some

employees had to relocate to a different site. Employees of this agency were teleworking (three formally and 90 informally) before these events occurred. The same amount of employees was teleworking immediately after and/or in recovery of the events. This telework arrangement has been continued and expanded after the recovery process was completed.

Flooding prevented a few employees of the fourth agency from reaching their regular work site at an unknown time in 1997. It took two days for the streets to be cleared. No damage to the agency was experienced. No employees were teleworking formally or informally before the event affected the agency. A small number¹⁰ of employees were teleworking informally immediately after/and or in recovery of the emergency. After the recovery process was completed, this arrangement was terminated.

The fifth agency experienced the Loma Prieta earthquake on October 17, 1989. The recovery process took three business days, staff returned to work on October 23, 1989. "Our site experienced power outages, damage to our computer systems and building structural safety was questionable. Employees could not return to work until the building had passed a structural inspection. Additionally, there was damage to the San Francisco Bay Bridge which impacted the commute from the East Bay region to San Francisco." Employees of this agency were teleworking before the event occurred, but exact data is not available. No employees were teleworking immediately after and/or in recovery of the emergency.

Questions 28, 29 and 30

What is your name and your e-mail address? What is the name and address of your agency? What is your present title and position?

These questions were asked for record keeping and questionnaire tracking. The answers are not relevant to the research and are not included to ensure anonymity.

Question 31

Do you have any comments you would like to share? (Please feel free to use extra paper, if necessary.)

- "We are still experimenting with telework. There is still a lingering concern that management may not be able to rescind telework in cases in which it does not prove viable."

¹⁰ Exact words: "minimal (a handful); exact number unknown".

-
- "XX¹¹ is currently in the process of developing and establishing a formal telework policy & program."
 - "Telework is embraced by some and is starting to be considered more frequently."
 - "There are no civil service employees on Telework/Telecommuting. Not allowed. One appointed/exempt employee informally uses telework."
 - "Telecommuting has been an unmitigated success at this department. While it is not without problems, they have not been any greater than those presented by on-site supervision, and it has allowed us to reap the many acknowledged benefits, from increased productivity to employee recruitment and retention. I heartily recommend the program."
 - "The telework program in our Department has met with varying degrees of success. While management is supportive of the program, they have not been overly strong in requiring middle management to comply with the program. This has caused low morale Departmentwide, as some employees are allowed to participate and others are not for no other reason other than the lack of willingness of change and try a fresh approach to doing business."
 - "The XX¹² has a telecommute program, that is incorporated into our Administrative Procedures Manual. Telecommuting is formalized between the employee, their supervisor and Division Chief and was implemented to reduce commute congestion and improve employee productivity. The formal agreements are not centralized, we do not have information regarding the number of days or employees who participate in the program."
 - "[...] Not all areas are completed in the survey due to XX¹³ not having a formal Telework policy nor a means of tracking the informal practices of telework. [...]"¹⁴

¹¹ To preserve anonymity, the name of the agency is not being given.

¹² op.cit.

¹³ op.cit

¹⁴ The square brackets indicate that the respondent gave administrative information about returning the survey. It is not relevant for the research and is therefore not indicated here.

**Telework and Emergency Management:
A New Understanding of
Handling Business Interruption**



Name: Stefanie Normann
Student ID: 9850589
Address: Poststrasse 5
22946 Brunsbek
F.R. Germany
Telephone: +49-(0)4107-7396
Telefax: +49-(0)4107-7328
E-mail: papendorf@bigfoot.com

Date: March 6, 2000

1st Supervisor: Prof. Dr. K.L.K. Brants
2nd Supervisor: Dr. J.M. Slevin

MA European Communication Studies
International School for
Humanities and Social Sciences
University of Amsterdam
Amsterdam, The Netherlands

Acknowledgements

In accomplishing this thesis and my Master's degree, several people helped me on the way.

Thank you to Uschi and Reinhart Normann for supporting me mentally, morally, financially and in kind in (almost) everything.

Thank you to Prof. Dr. Kees Brants for his never-ending criticism and suggestions.

Thank you to Lis and David Fleming for introducing me to the realms of telework, their professional advice and warm hospitality.

Thank you to my interview participants, Andrew Gaudes, Jack Nilles, Patricia Mokhtarian and Rick Tobin, who so willingly shared their knowledge with me. Thank you also to all the government employees who took the time and effort to complete the survey questionnaire.

Several people read earlier drafts of this document and helped it along with their comments. Thank you to Anna Nöteberg, Dr. Robert van Boeschoten, Victor de Pous, Rick Tobin and Lis and David Fleming.
All mistakes are, of course, solely my responsibility.

Table of Contents

<i>Acknowledgements</i>	<i>iii</i>
<i>Table of Contents</i>	<i>iv</i>
1 Introduction	1
2 The Problem	4
2.1 Research Question	5
2.2 Definition of Terms	6
3 What impact does telework have on the emergency management process?	8
3.1 Research Procedures.....	8
3.2 Literature Study.....	11
3.2.a Telework.....	11
3.2.b Emergency Management.....	15
3.2.c Telework and the Emergency Management Process	19
3.3 Interviews.....	24
3.4 Conclusions	31
4 How is telework employed in the emergency management process in California government agencies?	33
4.1 Research Procedures.....	33
4.2 Analysis and Interpretation of Results.....	36
4.2.a The Telework Situation (Questions 1-9).....	36
4.2.b Pros and Cons of Telework (Questions 10 and 11)	39
4.2.c Documented Emergency Preparedness (Questions 12-17).....	41
4.2.d Handling an Emergency Situation (Questions 18-27).....	42
5 Summary and Conclusion	47
<i>References</i>	<i>I</i>
Appendix A - Sections 14200-14203, California Government Code, Chapter 3	IV
Appendix B – Survey Questionnaire	VI

1 Introduction

You are the CEO of a company with 50 employees. In order to keep your deadlines and ensure the satisfaction of your customers that you depend upon, you need every worker every working day. You are located in a high rise in the downtown area of a metropolitan city, most of your employees live in the suburban quarters and because of lack of reasonably priced parking space commute by public transport.

Imagine a public transport strike. No busses, no trains, no underground. The strike lasts five days. Traffic jams everywhere and no parking space. Will your employees show up? Chances are, they will not get to work on time, if they get there at all.

How many customers will be dissatisfied with your service? How many employees do you have to pay although they did not do anything? How many workable hours will be lost? What costs do you have to pay although no income was generated?

If your employees were teleworking, things would have been different.

The 'telework' concept is based on computers interconnected through phone lines and the idea of moving information instead of people can lead to a number of direct and indirect improvements for the organization and management of the workplace and its operations.

The reduction of traffic, increased productivity, greater flexibility in balancing work and family demands and improved management of office space are well known benefits¹ of teleworking from home or a telecenter². Although telework

¹ Other benefits include improved recruitment and retention of qualified employees, added

can contribute immensely to handling business interruptions through crises or disasters, this area is little explored.

California is a place very prone to disasters. Located on the St. Andreas fault, the area experienced recently two major earthquakes³ and geologists expect another large earthquake within the next 30 years. Apart from natural disasters, also man made circumstances are threatening: In 1997, the State of California had by far the largest number of bombing incidents in the U.S. (FBI BOMB DATA CENTER, 1997). The State of California has an expressed need for effective emergency prevention, preparedness and management.

Since the implementation of a telework pilot project⁴ from 1988-1990 the number of teleworking government employees is rising steadily and in that regard the State of California is a model for governments and corporations around the world.

Disasters and emergencies cause interruptions to normal business procedures, in the private as well as in the government sector. Teleworking in emergency situations can successfully reduce business interruption, a connection that is to date not often made – to the detriment of business continuity.

employee morale, less sick leave, reduced parking space demands, improved air quality through reduced traffic, reduced costs of commuting, reduced costs of grooming.

² "[...] Shared office facilities that provide a range of office services, often for employees of several companies, or different departments of the same company. It means that employee can use the office that is most convenient to him or her, rather than specific office space owned by their company or department." (EUROPEAN COMMISSION, 1999:182)

³ Loma Prieta earthquake in the San Francisco Bay Area, October 17, 1989; Northridge earthquake in the Los Angeles area, January 17, 1994.

⁴ JALA ASSOCIATES, INC. (1990), *The State of California Telecommuting Pilot Project. Final Report June 1990*. Los Angeles, CA: JALA Associates, Inc.

In order to remain economically efficient and competitive, many business organizations adapt with a change in organizational structure and a strong use of information and communication technologies (ICT).

Bureaucracy, hierarchy and market forms are moving to more open and fluent shapes, often labeled 'interactive', 'network' or 'virtual'. ICT is defined by an increase in speed of communication, dramatic reduction in the costs of communication, a sharp rise in communication bandwidth, vastly expanded connectivity, and an integration of communication with computing technologies (DESANCTIS & FULK, 1998). The adoption of telework programs is one expression of these developments.

However, there are areas and disciplines with which the integration of ICT is very useful to optimize processes and solve problems. The employment of telework in emergency management is such an area.

The possible advantages and disadvantages of telework in emergency management are the focus of the first part of this study. The second part sets out to investigate how government agencies in California, USA, use telework, are prepared for disasters and apply telework in a disaster situation.

The data collection is based on an internship with the Telework Program at the Department of Personnel Administration of The State of California in Sacramento, California, USA.

2 The Problem

The State of California Telework Program is a collaborative project by the Department of Personnel Administration and the Department of General Services. It provides information, recommendations, training and assistance in implementing telework to all government agencies in California.

Since a telework pilot project was carried out from 1988-1990, a number of government agencies in the State of California have been involved in active development of their own telework programs. The telecommuting work option for the agencies is described in the document "Telecommuting Work Option. Information Guidelines and Model Policy", prepared by THE STATE OF CALIFORNIA TELECOMMUTING ADVISORY GROUP in June 1992. This model policy "recognizes the societal, management and personal benefits available through a carefully planned and managed telecommuting program." (THE STATE OF CALIFORNIA TELECOMMUTING ADVISORY GROUP, 1992:25). The guidelines mention specifically the benefits of telework in a disaster situation:

"Telecommute work and public services can continue uninterrupted during natural disasters, such as earthquakes, floods and fires, which may prevent routine access to the conventional office site." (THE STATE OF CALIFORNIA TELECOMMUTING ADVISORY GROUP, 1992:4)

One of the tasks of the State of California Telework Program is to establish criteria and guidelines for the evaluation of telecommuting programs, as provided in the California Government Code⁵, § 14203.

⁵ The complete section is provided in Appendix A.

"§ 14203. Evaluation of programs
Each state agency shall evaluate its telecommuting program. The Department of General Services shall establish criteria for evaluating the state's telecommuting program and recommend modifications, if necessary."

This study contributes to the framework of the evaluation of telework programs in government agencies in regard to telework's utility in emergency management. It will investigate feasible and advantageous ways to employ telework in emergency management to the benefit of all, and shed light on the current situation in California government agencies.

Through this, the study will aid in establishing evaluation criteria in this area and recommend modifications, if necessary.

2.1 Research Question

The research question is, therefore, twofold:

1. What impact does telework have on the emergency management process?
2. How is telework employed in the emergency management process in California government agencies?

The first research question is an exploratory research. It is to be carried out as a literature study and through interviews with selected knowledgeable individuals. The second research question is an assessment of the current status of telework and disaster preparedness and the use of telework as a tool in emergency management in California government agencies. It is a descriptive and exploratory research to be carried out via a survey.

2.2 Definition of Terms

Telework. Telework is an arrangement that permits employees to work in or near their homes for all or part of the workweek. It can also mean working at a project site or in a client's office. A formal telework agreement is written documentation of the arrangement. Informally teleworking employees are teleworking without a formal written agreement.

Disaster.

"Any event that creates an inability on an organizations part to provide critical business functions for some predetermined period of time."⁶

This could be flood, earthquake, fire, Y2K, bombing, bomb threat, snow, hurricane, ice, riots, war, and tornado (list exemplary not exhaustive).

Emergency management process. In the emergency management cycle, different phases can be distinguished. TOBIN & TOBIN (1997) divide this cycle into five phases: (1) planning and preparedness, (2) response, (3) relief, (4) recovery, and (5) mitigation. *Planning and preparedness* is what happens before a disaster occurs and involves everything that makes personnel, facilities and materials ready for a disaster as well as the steps and procedures to take afterwards. According to STRINGFIELD (1996:3), *response* is "those activities that are intended to stabilize and control the emergency situation." In practice, this phase is, for example, the rescuing of survivors and the immediate attempt to prevent further casualties and damage. *Recovery* "looks at those activities that

⁶ Disaster Recovery Journal, *DRJ's Glossary* [WWW-Document]
<http://www.drj.com/glossary/glossleft.htm> (February 9, 2000).

are designed to return the facility back to a functional status.” (STRINGFIELD, 1996:3) Since after, for example, severe hurricanes or earthquakes it can take years for the local population to return to their homes, this phase can take an extended amount of time. TOBIN & TOBIN admit that the line is thinly drawn between these two definitions and *relief* functions as a bridge between *response* and *recovery* in the emergency management cycle. This phase includes accommodation of humans and animals in shelters, feeding, medical care. *Mitigation* is what needs to be done after the immediate disaster is overcome: learning from mistakes in order to prevent a reoccurrence in the future.

3 What impact does telework have on the emergency management process?

3.1 Research Procedures

An impact assessment measures the extent to which a program causes change in the desired direction. It is based on a set of specified objectives and criteria of success (ROSSI & FREEMAN, 1993). Data needs to reveal what these changes are and to what degree changes can be accounted for.

This research question assesses the impact telework has on the emergency management process. It is to be assessed if telework during the emergency management process has advantages, disadvantages or is neutral to business operations, as they would take place in absence of a disaster.

Impact assessment is often conducted in connection with a cost-benefit and cost-effectiveness analysis. Whatever impact a program has is to be placed in perspective with the costs it incurs.

I focus on the impact assessment, because the costs of a telework program differ considerably depending on the extent and the conditions under which it is being implemented in a company. Practically oriented telework literature gives information about how costs are incurred. In practice, the costs for setting up a telework program are often returned within the first year of operation.

Answering this research question is an exploratory study. Exploratory research is carried out, when the area under study is relatively unknown and none or only vague assumptions about the structure exist. Often, exploratory studies are used

as pre-tests in order to gain more knowledge and are followed up with more focused and detailed research. Qualitative methods, such as interviews, are preferably used. (DIEKMANN, 1995)

Apart from literature study, I interviewed four individuals. I have opted for interviews in addition to literature study because very little has been written specifically on the issue of telework and emergency management. Therefore, interviews are an important additional source of information that is very up to date.

I have used a semi-structured open interview format, to invite the participants to share their definitions and experiences of the issues at stake. Although the participants are primarily used as a source of information about the topic, it is also my goal to understand the meaning they make of their experiences.

My interview participants are involved in telework or emergency management in their professional lives.

Andrew J. Gaudes is lecturer and Ph.D. student at the University of Manitoba, Winnipeg, Manitoba, Canada. He obtained an MA in Facility Management with a thesis on the integration of facility planning, virtual officing and business continuity planning. He presented his paper at the International Telework Foundation/International Flexwork Forum Conference in Tokyo, Japan in August 1999.

Jack M. Nilles is known world wide as the father of telecommuting. With his company JALA International Inc. (<http://www.jala.com>) he acts as a consultant for major corporations, governments and the European Union. He is the author of "The Telecommunications-Transportation Trade-Off" (1976) (with F.Roy Carlson Jr., Paul Gray and Gerhard J. Hannemann) and "Managing Telework"

(1998).

Prof. Dr. Patricia L. Mokhtarian is the director of the Telecommunications and Travel Research Program (<http://www.engr.ucdavis.edu/~its/telecom/>) at the Institute of Transportation Studies at the University of California, Davis. She has researched and written extensively on telework and transportation issues.

Rick Tobin provides with his company TAO Emergency Management Consulting (<http://www.foothill.net/~rtobin/tao/>) since 1987 emergency management services for all natural and man-made disasters. He is the author of "Emergency Planning on the Internet" (1998) (with Ryan Tobin).

The four interviews were completed by October 25, 1999.

3.2 Literature Study

3.2.a Telework

Jack Nilles, a Los Angeles based consultant, is widely acclaimed to be the “father of telecommuting”. Inspired with the possibilities of reducing commutes and thereby save energy and improve air quality, he coined the term telecommuting. In his 1994 publication “Making telecommuting happen” he introduces the reader to his fascination with the idea of telework with an event that opened his eyes in 1974:

“I was driving (alone) from home to the university one morning. As usual, the traffic was start and stop, mostly stop, on the Santa Monica “Free”way. The freeway has a series of large electric signboards located at intervals along its median strip. The purpose of the signboards is to flash traffic advisories to the freeway occupants. That morning there I was, completely stopped, staring at a seemingly endless string of glowing red brakelights ahead of me. I glanced up at the electric signboard ahead. It said: MAINTAIN YOUR SPEED. My speed was zero! And the clock was ticking. I was convinced that telecommuting had a future.” (NILLES, 1994:viii)

In the 1970’s, against the oil crises and a general increased awareness for environmental issues, a systematic avoidance of traffic was a first strong reason to promote telework arrangements. The word ‘telecommute’, solely used in the U.S.⁷, shows this first major focus. Telework as an approach to keeping the air clean, the roads empty and save resources was practiced only in the United States.

It took until the early 1980's that telework was applied in Europe as well. However, resource conservation was not the motivation. Telework was mainly

⁷ Many other languages, especially European ones, have no equivalent word for the English

regarded as a possibility for women with family obligations to join the workforce, providing a successful integration of the –necessary- work life with family needs. However, not only advantages were recognized:

"Typically, working from home is presented as a desirable option, enabling the individual worker to gain increased control of his or her life, and integrate work with other activities. However, coexisting with this optimistic vision is another, very different, stereotype: that of the homemaker as a highly exploited, isolated worker [...]." (HUWS, 1984:10)

In her study of homeworkers in Britain, HUWS (1984) concludes that workers are mainly female and their choice of working from home is dictated by a need to care for small children and not wanting or not being able to afford to give up their career. Working from home is by far not without problems, such as social isolation, childcare arrangements or unequal distribution of work over time. However, these potential difficulties appear less pressing to workers than the problems involved with working away from home.

Additionally, telework in the 1980's was characterized by only rudimentary employee security. A lot of teleworkers were self-employed, and therefore had to deal with all the difficulties a free-lance worker has to master. Employee contracts were usually not tailored to telework arrangements, nor was telework formally recognized. The vast majority of teleworkers, low skilled and low paid (57.6%⁸), engaged in data processing.

The spread of the Internet in the 1990's has opened up new perspectives for the application of technology in general and in the workplace in particular. Workplace design and facility management are key concepts in the telework

word 'commute' (NILLES, 1998).

⁸ From HUWS, U., KORTE, W.B. & ROBINSON, S. (1990), *Telework.Towards the Elusive Office*. Chichester: Wiley & Sons. In: KORTE & WYNNE (1996).

debate of the decade. In order to truly evolve the discussion, though,

"we need to develop new, integrative perspectives that provide more robust ways of analysing and theorising teleworking phenomena and so aid the task for understanding, implementing and managing it." (JACKSON & VAN DER WIELEN, 1998:3)

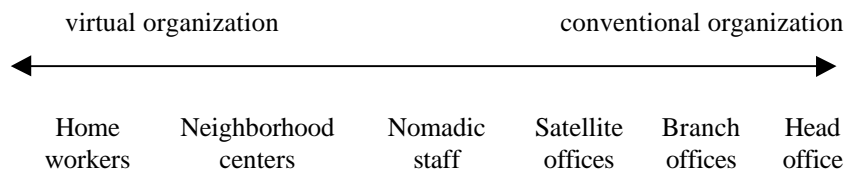
Telework needs to be fully integrated with discussions of city planning and the use of time and space, transportation planning, distance learning, virtual workplaces and other disciplines.

The fact that telework is a multi-faceted concept is reflected in the large number of definitions that exist today. Often they mirror the direct application for the user and definer and do not cater to the complexity of the issue. The concept has broadened considerably and become increasingly inclusive. What QVORTRUP calls the "conceptual crisis of telework" (QVORTRUP, 1998) is not over and an independent definition is yet to be found.

The "conceptual crisis" leaves all attempts of determining the number of teleworkers or realistic predictions about this number remaining little more than vague: without a bottom-line definition, what exactly is being counted or measured? This causes great difficulties for researchers in the comparison of measurements.

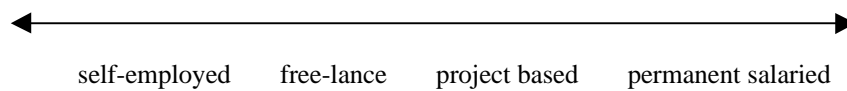
The European Commission centers its definition of telework around a common aspect: "the use of computers and telecommunications to change the accepted
EUROPEAN COMMISSION, 1999:182). Although this definition is fairly broad, it – again – neglects certain aspects that can be of crucial importance. Precisely for this reason, MCGRATH & HOULIHAN (1998) refrain from attempting to capture the phenomenon in a definition, and instead identify "defining features":

- *multiple manifestations*⁹



- *flexible location and employment status*

status of affiliation with an organization and connected with this the working location



- *centrality of information and communication technologies*
- *information-based work*

I believe this approach to understanding the concept ‘telework’ does justice to its complexity and is the most fruitful. It does not set artificial borders for the sake of a theoretical definition and also does not keep the concept unnecessarily blurry.

Focusing on the defining features, rather than on a limited definition that changes according to context, one can easily apply the concept to various real life situations and theoretical disciplines.

⁹ Graph adapted from MOORCROFT, S. & BENNETT, V. (1995), European Guide to Teleworking: A Framework for Action. Dublin: European Foundation for the Improvement of Living and Working Conditions. In: MCGRATH & HOULIHAN (1998)

3.2.b Emergency Management

"Disasters do not have to be 100 year floods or eight-point earthquakes. All it takes to be a disaster is something that could mess up approximately 1,500 square feet of very important property." (PERRY, D. S., 1999)

That is not as unlikely as one would think. This is the reason, why every company needs to be prepared to deal with an emergency at any point in time.

Sixty per-cent of companies struck by a major disaster go out of business within two years, claims the DISASTER RECOVERY JOURNAL¹⁰. This view is supported by a study carried out by the University of Wisconsin: it asserts that after experiencing a local disaster, 43% of businesses never reopen and almost 29% close within two years (IANNA, 1997).

If through an interruption of any kind a company is not operating for a specific amount of time, not only do costs keep running, unproductive time also does not generate income. The amount of time a company is paralyzed by a disaster seems of critical importance for corporate survival.

"In the first hour alone, it is estimated that more than 80 percent of the financial institutions would lose nearly \$1,000 per hour; and additional 10 percent [...] claimed losses of more than \$100,000 per hour." (IANNA, 1997)

The time and money that is needed to repair or renew equipment and facilities is to be added, as well as short- and long-term effects on the relations with clients, competitors, suppliers, financial institutions and other affiliates. Publicly traded corporations need to make all efforts to protect their shareholders' assets and

¹⁰ In: Call Center Quarterly, Disaster Strikes, 3 (1), Winter 1999 [WWW-Document]
<http://www.att.com/solutions/quarterly/CCQiii1/disaster.html> (August 31, 1999).

could face litigation. Government can fine various industries if regulations concerning safety and adequate disaster planning are not adhered to. Emergency preparedness can reduce the probability of occurrence of disasters and disruptions to operations. It minimizes insurance premiums and legal liability. (WOLD) Finally, loss of income results in loss of tax revenue.

The repercussions of business interruptions due to disasters affect everyone, directly or indirectly.

One of the characteristics of a disaster is that it comes as a surprise, it is impossible to foresee every event. It is therefore a company's best bet to be well prepared for an orderly and immediate relief and recovery.

The necessary procedures are documented in detail in a company's Business Resumption Plan. Its creation is often preceded by a Business Impact Analysis, which helps to identify the major threats and their impact on the organization. This procedure effectively reduces costs through avoidance and risk mitigation (LONG).

According to GLANCY & STAMIESZKIN (1997), instead of focusing on 'the big one' (it does not make any difference if a fire, earthquake or bomb destroys your building), companies are to invest in the development of recovery plans at the functional level. Resources are used unwisely in preparing for events with very low frequencies of occurrence. It is vital, though, to prepare for events with high(er) frequencies of occurrence that cannot be controlled effectively. Organizations need to emphasize contingency and recovery plans for those events. One can simultaneously add to operating efficiency, improve the organization's stability and with that its position in the marketplace.

"Integrating existing tools, such as those used for local incident recovery, into the disaster toolbox can dramatically lower acquisition, training, process development and maintenance costs for day-to-day operations as well as for contingency planning." (BAKER, VAN HISE & LUKO, 1997)

It is effective quality improvement.

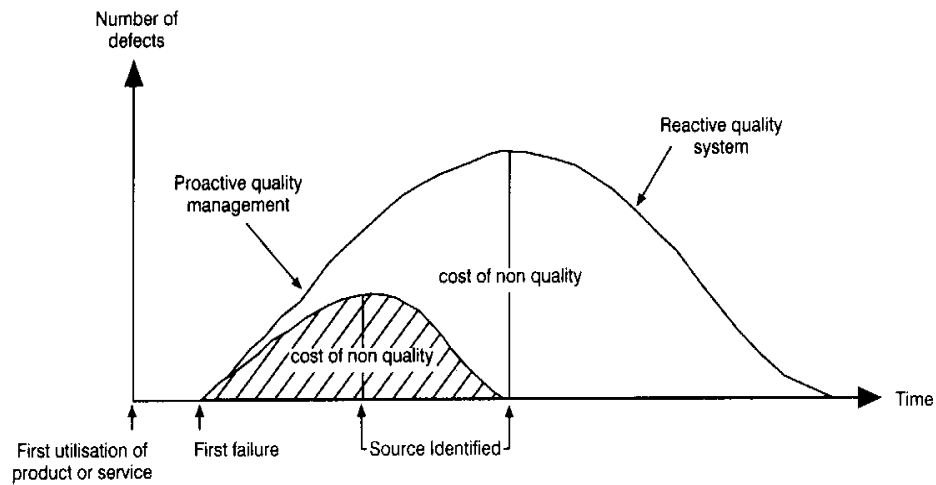
The tendency to look for simple and one-sided causes of a disaster is often reflected in their description as an 'act of God', 'unforeseen' or simply a 'failure'. This neglects social and organizational factors that may have contributed.

TOFT & REYNOLDS (1997:14-15) call for a "safety culture" within organizations, which acknowledges

"those sets of norms, roles, beliefs, attitudes and social and technical practices within an organisation which are concerned with minimising the exposure of individuals to conditions considered to be dangerous."

The development of such a "safety culture" is a prerequisite for accurate risk assessment and adequate disaster planning and preparedness. TOFT & REYNOLDS claim that disasters are incidents created by people operating within complex systems. It is vital to analyze these incidents and their creation within the system and learn the lesson they provide. Similar events can and do reoccur.

Emergency management therefore needs to be seen as a process of ongoing quality insurance. It not only ensures a quick recovery with as little business interruption as possible, but also simultaneously can increase the quality of work in the absence of a disaster. The following graph (TOFT & REYNOLDS, 1997:10) demonstrates that proactive quality management can reduce the number of defects and, if unavoidable, the costs that they induce.



In the case of proactive quality management the identification of the source and circumstances of a failure or disaster take place much earlier. Precautions and preparation measures can be taken, costs and damage can be minimized.

"(...) the notion that any organisation that engages in proactive risk management can make significant improvements in both human and financial performance is a credible hypothesis." (TOFT & REYNOLDS, 1997:10)

3.2.c Telework and the Emergency Management Process

A short review of three papers illustrates the application of telework in the emergency management process.

PRATT (1991a) studied the relation between teleworking and travel behavior under the disaster condition of the Loma Prieta earthquake that struck the San Francisco Bay Area in California on October 17, 1989. At the same time, the State of California conducted its telework pilot program. This made the Public Utilities Commission, a California Government Agency, an ideal study subject, because they had a fairly large number of participants in the pilot project before the earthquake and also added telecommuters after October 17. Many roads were destroyed and/or inaccessible and also part of the Bay Bridge, a major commuter traffic artery between Oakland and San Francisco, had crashed. PRATT concludes that the earthquake created a transportation emergency that could be alleviated with the help of telework. Almost 50% of employees that started to telework because of this emergency were still teleworking two to six months after the earthquake, which revealed that a long-term travel pattern change had been initiated. She mentions two crucial facilitating factors: Firstly, the fact that a telecommuting pilot program was in place at the time of the earthquake did not make organizational changes necessary in order to enable teleworking after the earthquake. Secondly, the Governor of California explicitly endorsed telework as an approach to dealing with the situation. This endorsement was issued as Executive Order D-82-89 on October 31, 1989 and provided an important incentive.

SATO & SPINKS (1998) deal with the implications of the Great Hanshin earthquake, which occurred on January 17, 1995 in Kobe and the surrounding area in Japan. With the help of a survey of corporations and employees, they

discovered that as a result of the earthquake, half of the corporate respondents went through a period of slowdown or standstill in business activity in excess of one month. Also, far more than half of the companies (69.7%) were not able to contact their employees until several days after the quake. No company had used telework as a method to reduce physical movement of people. Only 12.2% were well prepared for an earthquake disaster and had a crisis management manual with an earthquake scenario in place.

These and matching findings among employees leaves the authors to conclude that modern urban areas which concentrate a large number of business entities, people and infrastructure networks critically need to reassess their emergency preparedness. Foremost, they identify the use of computer and communication technology for the reduction and elimination of daily commutes and the decentralization of office functions.

“Incorporating Portable Offices Into A Contingency Plan” (PRATT, 1991b) describes the fire that broke out in an important part of the building of the newspaper *Dallas Times Herald* in Dallas, Texas in June 1990. By the time the president of the paper arrived at the building, firemen had already closed it off. With the help of mobile phones and laptops, work continued. The printing was transferred to another site and during the three days the break down lasted, the paper did not once miss publishing an issue. The *Dallas Times Herald* did not have a teleworking program in place before the fire. The newsroom staff, which was the only part of the organization involved, adapted so quickly because they were already equipped with mobile phones and portable computers and knew how to use them.

These three situations can be analyzed along the four defining features of telework and the five phases of the emergency management cycle.

The first article describes the advantage of not having to initiate organizational changes in the disaster situation because the pilot project was running and several employees were already teleworking before the earthquake. PRATT (1991a) diagnosed a transportation problem, it was difficult for employees to get to work through response, relief and recovery – which in this case took months. This corresponds with telework's defining feature 'multiple manifestations', the fact that employees do not have to commute to their workplace.

SATO & SPINKS (1998) identify the lack of telework as a great disadvantage in dealing with business interruption during and after the Kobe earthquake. It can be concluded that the reduction of commutes and the decentralization of office functions through technology, corresponding to defining feature 'multiple manifestations' and 'centrality of information and communication technologies', would have improved all phases of the emergency management process.

Employees at the *Dallas Times Herald* were not *per se* teleworking previous to the fire, but they were working with laptops and cell phones in a mobile way. In this case, the response, relief and recovery phase was relatively short. Because employees worked in places other than the main office on a regular basis, the fire did not create a major interruption in conducting business: The paper did not miss a single issue.

Assessing the business interruption effects of the Northridge earthquake, which took place on January 17, 1994 near Los Angeles, California, was the focus of a study conducted by the University of Southern California (GORDON ET. AL., 1995). They chose to analyze this disaster, because it was the first moderate to large earthquake with an epicenter inside a large metropolitan area in the USA

since 1933. Through a telephone survey, businesses and employees were questioned. 81.1% of the respondents indicated that their operations were interrupted. The three most mentioned reasons for the interruption of operations were (1) difficulty of employees getting to work (77.8%), (2) attention of employees to personal matters (73.5%), and (3) damage at the workplace (71.3%)¹¹. GORDON ET. AL. concluded from previous research that small companies are more and longer affected by earthquakes than large firms. This is because small firms do not have extensive financial resources and do not have multiple sites where work and/or employees could be located to. The authors estimate the total lost output at 5,945 billion \$ and the job loss at 75,582 person years. It is vital to acknowledge that lost business always results in reduced tax revenues. GORDON ET AL. claim that the lost output after the earthquake means a minus of 529.2 million \$ for the Federal government, 163.0 million \$ for State government and 164.4 million \$ for local government.

As mentioned above, the main reasons for business interruption in this study were that employees either could not get to work or the place where they were supposed to work was damaged. Telework could help in both cases ('multiple manifestations'). Additionally, if employees are working at home, they do have the possibility of attending to personal matters as well, as they do not have to leave their house.

¹¹ Multiple responses were possible.

Results

In none of the cases portrayed was telework set up because of its benefits in a disaster situation. Where it was in place, it resulted in the fact that employees could continue to work, remain productive, although either the work site or the commute way had been damaged. Business interruption was minimized or dealt with in such a way that the work performed was not affected at all. The fact that employees were not confronted with a complete reorganization of their work, helped to avoid a disaster after the disaster. It shows that establishing telework during the planning and preparedness phase is an important precondition for successful teleworking during disaster response, relief and recovery.

Out of the defining features, 'centrality of information and communication technologies' and 'information-based work' are prerequisites in the literature. Manufacturing or similar work is not mentioned. The focus lies on the 'multiple manifestations' of telework, the different locations. That is precisely the area where the main advantages are seen. Through working at a different location and the decentralization of people and information, the interruption to business is kept at a minimum.

As the GORDON ET AL. study reveals, another advantage of the telework location 'home' can be that in the response, relief and recovery phase, people might have personal business to take care of (family matters caused by the disaster) and would not want to or would not be able to leave their home.

3.3 Interviews

According to Andrew J. Gaudes¹², telework provides companies with one, but not the only answer, to a lot of problems and questions. He mentions the advantages of having people work without having to be co-located and through working at home offering solutions to family related issues. Additionally, telework provides a way of dealing with rapid expansion or shrinking of companies. The biggest problems with telework are psychological factors. “We’ve evolved the technology in physical so fast, but we are still years and years behind mentally and socially to do this.” He refers to the reorganization of the workday, as in how do people mentally separate work from home if there is no commute? How do managers manage employees they do not see?

Production or manufacturing, work that happens with equipment that is stationary, is not a good candidate for telework. Gaudes also indicates that there are some personalities that would not be good teleworkers, because of the way they operate. However, anyone that does office work is a potential teleworker.

What is the role of telework in emergency management? “It conditions people to work in a more dynamic environment. That’s the biggest plus, that if your physical facilities are shut down, [...] that when you’re forced to do that [teleworking], it comes naturally.” Not knowing how to deal with telework or mobile equipment can be as much of a crisis, as the event that triggered the disaster. Teleworking can also distribute the risk of business interruption because of damage to the physical facility over a number of geographical locations and technological media. In terms of phases of emergency management, Gaudes does not commit to one or more specific ones. He

¹² Andrew Gaudes is lecturer and Ph.D. student at the University of Manitoba.

believes that teleworking can be successfully used in any situation that “threatens the core activity” of a business. If telework is happening anyway, a lot of crises will not even be identified as crises because employees can operate right through it. [Example of a snowstorm] “So you are standing there and say I can’t get to work, we have a crisis. But if you have a computer and would be able to work from home it would never even come to cross your mind as being a crisis.”

According to Jack M. Nilles¹³, the awareness for telework in companies today is increasing continuously. Large companies are much more into telework than small ones. The advantages of telework he describes like this: “The most important reason for a company to do it is economic. The most important reason for the world to do it is environmental. The most important reason for an individual to do it is stress relief.” One has to work on each group with the dimension of telework that appeals most to them. However, the most important one is the employer. “You have to have fairly convincing evidence that this new craziness works before they’ll do it.” A disadvantage of telework is that it does not work for all jobs and for all people. The main concern, though, is attitude problems. The implementation of a telework program takes time and effort and you have to be consistent. If you observe these factors, then telework works very well. Nilles thinks the reason why companies do not telework is because they are afraid of it.

Companies are poorly prepared for disasters, not because they do not think it is necessary but simply because it is not a high priority item on their to do list. In order to include telework as a part of their emergency management, “you have to sell it to a company for a different reason entirely. Even though it is crucial for survival.” One has to convince a company with a bottom line economic

¹³ Jack Nilles is the father of telework and consultant and author in Los Angeles.

improvement through telework. Successful emergency management is one of the advantages but not the reason the company will make the decision.

Telework is of advantage in any disaster that does not wipe out the telecommunications infrastructure and the energy supply. In terms of companies, any organization that requires its employees to communicate – and most companies are like that – can benefit from telework in a disaster situation. Repeatedly he emphasizes that telework needs to be established as “business as usual” first before it can be successfully employed in an emergency situation.

Patricia L. Mokhtarian¹⁴ says that for some companies, telework is well known and used, but most have not caught on. They might have informal teleworkers but most companies do not have a formal telework program. According to her, there is a long way to go before the full potential of telework is realized for companies. The main advantages for employers are space savings, improved recruitment and retention, customer service and productivity increases. For the employee they are increased flexibility, reduced stress, costs of commuting and grooming. Problems with telework can occur when there is a lack of trust between employer and employee. Also, telework can induce workaholic tendencies or social isolation. A reason why telework is not more popular, Mokhtarian sees in a resistance to change in general. Management is concerned if people are really working. Also, it is not always that a technological solution turns out to be accepted by everyone. Initially, she had assumed that once an employee had the chance to telework, s/he would stay a teleworker, would be a “permanent adopter”. She found that not to be the case, a lot of people switch back and forth and alter intensity according to changes in their work tasks and personal lives.

¹⁴ Patricia Mokhtarian is professor at the University of California, Davis.

Her sense as an “ivory tower academic” is that most companies ignore emergency planning. The role of telework in emergency management can be huge, and she thinks that telework does happen on an *ad hoc* basis after a disaster, but that it is not sustained once it is not immediately necessary anymore. Mokhtarian categorizes disasters in “the kind that just damages your building”, “affecting [...] a geographical area of some size”, “affect[ing] the transportation system” and “things that you wouldn’t necessarily call emergencies or disasters but sort of problems waiting to happen”, such as civil unrest.

In employing telework in the emergency management process, one needs to recognize that employees may have personal problems to deal with and employers should therefore not expect full productivity. Maintaining communication is another important aspect. Jobs that clearly demand being somewhere are obviously ineligible for telework. In an emergency, one can and would bend the rules on selection and performance of teleworkers and include employees who would not telework under normal circumstances.

According to Rick Tobin¹⁵, the function of telework in companies differs with their size. For small business the biggest advantages are keeping production high and employees happy. For large companies, it allows flexibility in the hugeness rather than bottom line money saving. Because government does not have a competitive basis, they operate in a regulatory environment and telework can help them to comply with certain requirements. Tobin thinks fear is the biggest issue in not doing telework. This fear exists mainly at the level of middle management. Also, the successful implementation of a telework program takes time, and because one is dealing with changing people’s lives, it is important to act in a consistent and committed manner. As the generations change, there are

¹⁵ Rick Tobin is emergency management consultant and author in El Dorado, California.

paradigm shifts in management style. The technology is developed, employees are willing and such a paradigm shift in leadership is beginning to occur. In ten years, one of the standard questions in a job interview will be: "Can you work

Tobin says that until 1990 companies rarely dealt with emergency planning. Where they were aware of it, insurance premiums were the main reasons they did it. Now, "there is rarely a company in the country that has not become aware of the needs to plan." The fact that officers can be held directly responsible and the difficulties of finding insurance coverage are factors. Small businesses, though, are mostly poorly prepared, less than 20% have proper planning in place. This is a critical issue, because 75% of the people in the U.S. are employed by small business. The reason is mostly the lack of financial resources.

Recovery is the period where telework can help the most because depending on the disaster and the damage it caused, the recovery can take months or years. During this time, telework keeps the company operating. When employing telework in the emergency management process, productivity expectations should be kept low during the first quarter of recovery. If the disaster is large, employees might have personal issues to take care of. Also, one needs to look at the technology one depends upon. Distribution over different technologies as well as using technology in various ways is vital. He also recommends alternatives to telework, such as hot/cold sites or shared office space with other companies. Someone who is because of the disaster in an unstable family or living situation is not a good candidate for telework. Manual labor jobs are excluded.

Results

The four interviews reveal that before telework can be used successfully after a disaster has happened, employees must have been trained properly and given the chance to try it. Only if employees are familiar with the telework situation under normal circumstances will they know how to perform their work effectively in the disaster situation. This view places emphasis on telework in the emergency planning and preparedness phase. Additionally, if telework is well institutionalized and working, some events might not be identified as a crisis or disaster, because it would only influence 'normal' work, but not work performed through telework. Recovery is another phase in which telework can support dealing with the disaster. Depending upon the event and its repercussions, the recovery process can take several months to years. Telework enables employees to keep working during this time and therefore contribute to business procedures and the bottom line. Business interruption can be kept at a minimum.

Information-based work is a prerequisite to enable telework. The different location and with that changed commute patterns ('multiple manifestations'), is the main advantage in a disaster situation. A disaster always affects a location, and telework, through its feature of flexible location enabled through ICT, offers the possibility of avoidance of the affected location allowing work to happen at another place.

In employing telework in a disaster situation, one needs to recognize that employees might be personally affected and, therefore, one should not expect full productivity from them. Distribution of technology should also be considered, otherwise, one might be as helpless as without technology. One needs to recognize that a disaster does not always have to be an earth shattering catastrophic event. For a business, even, for example, severe winter weather for a couple of days can be a crisis situation that can be successfully dealt with through telework.

Telework and emergency management are both concepts whose potential and range of benefits have not yet been fully realized by companies. The development of emergency management, through the awareness of possible Y2K problems, has received a push. In realizing telework, cultural factors need to be overcome, and a lot of convincing is yet to be done.

3.4 Conclusions

Disadvantages or neutralities of telework in a disaster situation are not portrayed in the literature. No information is given on teleworking during the mitigation phase. Understanding mitigation as controlling or even preventing a disaster from occurring, this phase is similar to planning and preparedness and has the same advantages. All cases deal with permanently salaried employees and therefore reveal no information about the benefits or drawbacks of different employment categories in emergency management.

Disadvantages or neutralities of telework in a disaster situation are not portrayed in the interviews. The participants do put limitations on who, how and when it can be applied, but within those parameters, they do not mention factors that would put a company at a disadvantage compared to one that did not use telework in the disaster situation.

In a worst case scenario, the telecommunications infrastructure is destroyed and cannot be repaired within a reasonable time frame. In such a case, any kind of business continuity may be impossible because of general destruction. In less severe events, telework does contribute to business continuity. If, for some reason, teleworking would not be possible, previous implementation of a telework program is at worst neutral to the situation. It has optimized work processes before the disaster, though, and has generally been a gain for the organization.

From the data it can be derived that telework has the most benefit during the recovery phase of a disaster. This includes telework being used in planning and

preparedness, because it has been widely proven that *ad hoc* teleworking without training and practice is not successful.

In the recovery phase, telework is beneficial for two reasons:

1. There is no or little commute.

This applies when there is a regional disaster or other transportation or traffic problem.

2. Work does not happen at the main office.

This applies in a local disaster or other site problems.

The reason why other phases are not elaborated is likely to be the fact that response as well as relief are not clearly differentiated against other. Both phases may overlap, also with recovery. Further, they are comparatively short and are mainly in severe disasters of importance. Mitigation can overlap with recovery. Additionally, this phase does not deal directly with the disaster anymore.

The main benefit is the minimization of business interruption through reduction of unproductive workable time during a disaster.

4 How is telework employed in the emergency management process in California government agencies?

4.1 Research Procedures

The second research question is answered through a survey. It is a descriptive as well as an exploratory study. Partly, the survey produces statistics, in order to collect information on the number of teleworkers, the regularity of teleworking, the status of teleworking in an agency and their preparedness for emergencies. Additionally, the occurrence of disasters and their management, especially the role of telework in it, is being investigated. In this exploratory part, the survey questions are open and to be answered in text form.

I developed a questionnaire that was to be sent to a sample of California government agencies and to be answered by the person responsible for telework/telecommuting or emergency management. I tested the questionnaire with five employees of the Department of Personnel Administration (DPA), all of whom were familiar with telework. Unclear items and insufficiencies were adjusted.

Initially, I wanted to conduct the survey online, but the web site staff of DPA advised against it. At this point in time, not all California government agencies have access to the Internet and e-mail, therefore, one could not reach everyone through this medium. For this reason, the questionnaire was mailed out on paper and additionally posted on the DPA web page for download. This way, respondents had the choice whether they wanted to complete the questionnaire

on paper and return it by mail or fax or fill it in electronically and return it via e-mail.

For time and money reasons I opted for a non-probability sample of California government agencies rather than a census of all 154 agencies. Non-probability sampling¹⁶ is used in research that is to generate new ideas and understandings, which are followed up with a systematical test at a later point. Because the accuracy of a non-probability sample estimate is unknown, the information that is gained only applies to the sample and cannot be generalized over the target population (SALANT & DILLMAN, 1994:64). Moreover, California government agencies are very heterogeneous in their organization, size, location and tasks, and it is, therefore, doubtful that such a small probability sample would provide useful data.

For the selection of the sample, I grouped the agencies along two lines, the number of employees and previous telework involvement. As mentioned earlier, the size of an organization is related to its telework use¹⁷. The second criterion for grouping is whether an agency has been participating in the telecommuting pilot project and whether or not it was/is actively developing formal telework policies and programs. I expected both criteria to be related to open-mindedness and interest about aspects and potential benefits of telework and their development. The selection was based on random as well as on choosing

¹⁶ "Nonprobability [...] sampling is appropriate in certain circumstances, especially for exploratory research intended to generate new ideas that will be systematically tested later. [...] in contrast to a probability sample, we have no way of knowing the accuracy of a non-probability sample estimate. [...] hence, whatever new information is gained through the research applies only to the sample itself." (Salant & Dillman, 1994:64)

¹⁷ Out of the 22 California Government Agencies that participated in the pilot project, 12 (55%) have 1000 or more employees. This is to be understood against the background that out of the 154 California Government Agencies, only 31 (20%) have 1000 employees or more.

those who would be likely to answer and provide useful information.

The questionnaire was mailed out on November 10, 1999.

Sample

<i>Group</i>	<i>Description</i>	<i># of selected agencies</i>	<i>% of the sample</i>	<i>% of the population</i>
A	999 and fewer employees / without telework involvement	8	21	62
B	1000 and more employees / without telework involvement	9	23	6
C	999 and fewer employees / with telework involvement	11	28	20
D	1000 and more employees / with telework involvement	11	28	12
		39	100	100

4.2 Analysis and Interpretation of Results

Returned questionnaires

<i>Group</i>	<i>Description</i>	<i># of sent questionnaires</i>	<i># of returned questionnaires</i>	<i>%</i>
A	999 and fewer employees / without telework involvement	8	5	24
B	1000 and more employees / without telework involvement	9	3	14
C	999 and fewer employees / with telework involvement	11	7	33
D	1000 and more employees / with telework involvement	11	6	29
		39	21	100

Twenty-one questionnaires were returned by January 18, 2000. That is a return rate of 54%.

4.2.a The Telework Situation (Questions 1-9)

The first part of the questionnaire assesses the telework situation of the agencies.

About half of the respondents (11) do have employees working in a formal telework agreement, the other half (10) does not. About half of the respondents (11) have informally teleworking employees, seven do not and three do not know.

11 agencies <i>with formal</i> teleworkers (52%)	⇒ 3 agencies <i>without informal</i> teleworkers (27%) ⇒ 8 agencies <i>with informal</i> teleworkers (73%)
10 agencies <i>without formal</i> teleworkers (48%)	⇒ 4 agencies <i>without informal</i> teleworkers (40%) ⇒ 5 agencies <i>with informal</i> teleworkers (50%) ⇒ 1 agency does not know (10%)

Of the 11 that do have formal teleworkers, 27% have no informal teleworkers and only operate with a formal program. 73% have simultaneously formal and informal teleworkers.

Of the 10 agencies that have no formal teleworkers, 40% also have no informal teleworkers and 50% do have informal teleworkers. 10% do not know.

From the four agencies that have no teleworkers at all, the majority was never involved with telework before.

As it was to be expected, those agencies that were previously involved with telework are more likely to have formal teleworkers than those who were not. 62% of agencies that were previously involved with telework now have a formal program. Against that, 38% of agencies that were not previously involved with telework took themselves the initiative and now have a formal telework program.

50% of those agencies that were not previously involved with telework now do have informal teleworkers. At least¹⁸ 58% of those agencies with previous telework involvement have informal teleworkers.

¹⁸ Two respondents did not know the number of informal teleworkers in their agency or were unable to determine this number.

<i>Without</i> previous telework involvement (group A and B)	⇒ 38% now have <i>formal</i> teleworkers ⇒ 50% now have <i>informal</i> teleworkers
<i>With</i> previous telework involvement (group C and D)	⇒ 62% now have <i>formal</i> teleworkers ⇒ 62% now have <i>informal</i> telework

Formal teleworking is more popular with agencies with previous telework involvement. Agencies with no previous involvement, if they do telework, are more prone to informal teleworking.

It can be concluded that formal and informal telework are equally popular. The main reason for choosing informal over formal telework is that respondents see no necessity to formalize teleworking and find it easier to handle on a project specific case by case basis.

Five agencies were involved with telework previously and now do not have formal teleworkers. Why did these agencies drop the idea of a formal telework program? The majority of these five confirm that they have informal teleworkers. Obviously, these agencies prefer informal over formal telework arrangements.

The numbers of teleworkers per agency differ greatly, one agency has only three formal teleworkers and another has 568. The fact that large organizations are much more likely to offer telework to their employees cannot be substantiated here. There is no pattern in having or not having teleworkers (formal and informal) for large and small agencies.

Three agencies started their formal teleworking during the pilot project, which

they all were a part of. Two of those also began informal teleworking during the pilot project.

The other agencies started at some point after January 1990.

For most agencies both formal and/or informal telework has proven to be successful and they have increased the number of teleworkers since they started offering the telework option. Only two agencies have decreased the number of telework since the beginning.

In order to avoid social isolation, it is generally advised that teleworkers telework no more than 3 days a week, special circumstances excluded. The vast majority of respondents seem to agree with this.

73% of respondents indicated that their formally teleworking employees telework one or two days a week, only 18% indicated that their formally teleworking employees telework three or four days a week.

50% indicated that the informally teleworking employees are teleworking one or two days a week. 25% indicated three days. None indicated four or five days. 8% each indicated 1 day per month and .5 to one day per week.

Informally teleworking employees are teleworking more days a week than formally working ones. This is an interesting fact. Especially with informally teleworking employees the number of days is likely not to be well monitored and controlled. Problems of social marginalization could occur.

4.2.b Pros and Cons of Telework (Questions 10 and 11)

The second part of the questionnaire deals with the value agencies place on telework and their reasons for and against it.

These questions posed some difficulty to respondents, as several did not answer as directed with a ranking '1' (most important), '2' (second most important),

etc..

The most important reason for telework for a large number of agencies (43%) was clearly 'greater flexibility for employees'. 'Space savings' and 'productivity increases' are the most important reason for 10% and 14% of respondents respective.

The second most important reason is also 'greater flexibility for employees' for 24%. 'Improved recruitment/retention' and 'productivity increases' are the second most important reason for both 19%. Improving air quality and reducing traffic was also mentioned, but not as important reasons to do telework. Interestingly, the option 'risk management' also has very low priority.

These answers reveal a commitment to the employee and the recognition that today work does not always happen between nine and five at the same desk in the office. The employee's need to juggle various commitments is accommodated.

Asking for the main reasons that discourage teleworking¹⁹ in their agency, only eleven respondents (52%) answered with a ranking as directed. Out of those, 14% of respondents do not agree with the concept of telework. Also 14% of respondents each answered that none or the minority of the tasks within the jobs are location-independent. Two reasons respondents indicated themselves were "1. There is no formal policy. 2. Inadequate support for information technology support." (5%) and "difficulty to ascertain level of productivity of many involved in the telework program." (5%).

¹⁹ The high number of answers not given as directed reveals that respondents had problems with this question. The comments showed that "discourage" is a too strong word, rather agencies are hesitant whether telework really is a useful measure or clearly had problems in the process of implementing it.

4.2.c Documented Emergency Preparedness (Questions 12-17)

The third part of the questionnaire assesses the situation of documented emergency planning and preparedness and the role of telework in it.

A Business Resumption Plan (BRP) covers specific Y2K requirements²⁰ and planning for resuming normal business activity following a disruptive event. It is not required for all agencies. Still, 81% of respondents are prepared for Y2K related problems and have a BRP. However, only 53% recognize telework as a way of dealing with Y2K problems.

Continuity Planning for Business (CPB) is a document which deals with planning for the interruption to the normal business activities due to a disruptive event, focuses on Y2K at the moment and identifies risks specific to each agency. 90% of respondents do have a CPB, which makes it the most common document for emergency preparedness among respondents. Here also, 53% recognize telework as an approach of business continuity.

The Operational Recovery Plan (ORP) identifies a set of procedures to assure continued agency operation in the event of a disaster and is the key piece. Every agency is required to have an ORP and review and update it regularly. 86% of respondents have their operational recovery planned. Here, 61% recognize the contribution telework can have towards operational recovery.

N=20

	<i>BRP (%)</i>	<i>CPB (%)</i>	<i>ORP (%)</i>
Yes	81	90	86
No	14	0	5
No answer	5	10	9
	100	100	100

ORP is a requirement and every agency must have one. It is remarkable that

²⁰ Y2K was a serious emergency management issue at the time this survey was carried out.

14% of respondents either do not have one or chose not to answer this question. They do not comply with regulations and therefore are not adequately prepared for an emergency situation. The document that identifies risks for each agency, the CPB, is more valued, as 90% have it.

Telework is little recognized as a vital approach to the reduction of business interruption. Roughly only 50% included telework in their documents.

	<i>Telework in BRP</i>	<i>Telework in CPB</i>	<i>Telework in ORP</i>
	N=17	N=19	N=18
Yes	53%	53%	61%
No	57%	47%	39%
	100	100	100

There is no pattern in the relation between an agency having telework (formal or informal) and their recognition of telework in their documents. It is, however, interesting that two agencies that do not have any teleworkers at all have included telework in all their plans!

4.2.d Handling an Emergency Situation (Questions 18-27)

The fourth part deals with emergencies that occurred in the past ten years and the role of telework in their management.

Five respondents indicated that an emergency or disaster had happened in the past ten years that made their building unusable, prevented or disabled employees from reaching their regular work site, and/or impaired in any other way physical access to and/or usage of the regular work site.

The first agency experienced two fires in its building, which caused air quality problems in July and December 1998. The recovery process took a minimal number of days. The damage to supplies in the building was significant. Access

into building lobby was limited. Approximately 20 employees of this agency were teleworking formally before these events occurred. Approximately 10 employees were teleworking informally immediately after and/or in recovery of these events. This teleworking arrangement was terminated after the recovery process was completed.

The second agency experienced a fire alarm threat, a bomb threat and an electrical outage in December 1998. The recovery process took a few hours. No damage was experienced, apart from a few unproductive hours. Employees of this agency were teleworking (none formally and one informally) before this event occurred.

The questions about the number of employees teleworking immediately after/and or in recovery of the emergency and if this teleworking arrangement was continued, expanded or terminated after the recovery process was completed were not answered.

The third agency experienced a water pipe burst, small fire and possible asbestos spill at various points in time during the past ten years. The recovery process was an unspecified number of days (as opposed to months or years). The damage this agency experienced was water and equipment damage. Some employees had to relocate to a different site. Employees of this agency were teleworking (three formally and 90 informally) before these events occurred. The same amount of employees was teleworking immediately after and/or in recovery of the events. This telework arrangement has been continued and expanded after the recovery process was completed.

Flooding prevented a few employees of the fourth agency from reaching their regular work site at an unknown time in 1997. It took two days for the streets

to be cleared. No damage to the agency was experienced. No employees were teleworking formally or informally before the event affected the agency. A small number²¹ of employees were teleworking informally immediately after/and or in recovery of the emergency. After the recovery process was completed, this arrangement was terminated.

The fifth agency experienced the Loma Prieta earthquake on October 17, 1989. The recovery process took three business days, staff returned to work on October 23, 1989. “Our site experienced power outages, damage to our computer systems and building structural safety was questionable. Employees could not return to work until the building had passed a structural inspection. Additionally, there was damage to the San Francisco Bay Bridge which impacted the commute from the East Bay region to San Francisco.” Employees of this agency were teleworking before the event occurred, but exact data is not available. No employees were teleworking immediately after and/or in recovery of the emergency.

The answers show that localized disasters are very likely to occur. Even among the small number of four agencies, seven different local disasters affected operations. Only one agency reports a regional disaster, the Loma Prieta earthquake. The recovery process for the local disasters ranged from a couple of hours to a couple of days, which shows clearly that in every case usual business procedure was interrupted for a significant amount of time.

Only one agency²² continued and expanded teleworking after the recovery process was completed. This clearly shows that the lesson provided was not

²¹ Exact words: “minimal (a handful); exact number unknown”.

²² This agency is from group B. It has 1000 or more employees and has not been involved

learned by all. Additionally, I understand that the expansion of the telework program in this one agency was not triggered by their experience in the recovery process, as they had the same number of teleworkers before and after the disaster. The important benefit must have been in another area.

In four of these five agencies employees were teleworking (formally and/or informally) before the event/s. Two agencies increased their number of teleworkers immediately after and/or in recovery of the event/s. They recognized that telework was one way to keep workers working while recovery was going on. Two agencies did not add teleworkers during the recovery process. It would be interesting to find out why, whether they did not see telework in general as useful during the recovery process or whether maybe local and situational circumstances had lead to a decision against it.

The first, fourth and fifth case have been previously involved with telework and have 999 or less employees. The second agency is from group A, has 999 or less employees and has not been involved with telework previously. This demonstrates that especially those agencies that do use telework in their regular business procedure do not exploit its advantages in an emergency situation.

There is no apparent pattern of agencies (not) employing telework in emergency management, documented emergency preparedness and the inclusion of telework in the plans. The agency that continued and expanded their telework program, though, had telework included in their emergency management plans.

with telework previously.

5 Summary and Conclusion

On the basis of telecommuting guidelines (THE STATE OF CALIFORNIA TELECOMMUTING ADVISORY GROUP, 1992) for government agencies in California, telework is recognized as a very useful measure for the enhancement of business continuity during a disaster situation.

Firstly, this study set out to investigate feasible and advantageous ways to employ telework in emergency management. Further, the telework and emergency management situation and a possible combination of the two in government agencies in California was being researched.

Literature study and four interviews with individuals working in the telework and emergency management area covered the first part. The second part dealt with a survey among a non-probability sample of California government agencies²³.

Telework does have a positive impact on the emergency management process. If the fears of telework at the management level can be overcome and the application of ICT is accepted as one way to solve problems or optimize situations, telework as a method of management can improve work processes substantially.

Emergency preparedness is part of the philosophy of a responsible business organization. Not only can possible damage be avoided; it is also part of continuous quality insurance.

²³ There are 154 California Government agencies. The selected sample consisted of 39 agencies. 21 questionnaires were returned.

The main benefit and goal of telework during the emergency management process is that business operations continue. If business procedures are affected, telework does not enable full performance, but it does minimize interruptions, thus ensuring the provision of services, maintaining control of the income and through that corporate survival. Depending on the disaster, the effects of it may not even affect work tasks performed through telework and business is not interrupted at all. The implementation of telework as part of planning and preparedness is vital, so employees have experience with handling the equipment and the work situation.

Information-based work and centrality of information and communication technologies considered as preconditions for teleworkable jobs, the relocation of the worker is the feature that enables the main benefit. Elimination of commute and the decentralization of work are crucial advantages in the case of a disaster.

The costs of employing telework in a disaster situation were not part of this study. The financial investment of the implementation of a telework program depends on the number of teleworkers, the extent of equipment support, training etc. The cost can therefore differ greatly. However, using telework in the emergency management process does not incur any extra costs, it rather provides another incentive increasing return on investment.

In California government agencies, telework has been increasing since the pilot project. Only 19% of respondents are not involved with telework at all at the time of the survey (December 1999). Formal and informal telework are equally popular and the main reason agencies offer it is greater flexibility for the employee.

Emergency planning is in place in all agencies in the form of some document.

Roughly half of the respondents have incorporated telework in their documented preparedness, which shows that the other has not realized the benefits of it in a disaster situation.

Local disasters are much more likely than 'the big one' and therefore need effective preparedness. Few respondents did use telework in dealing with the situation, this, however, was terminated once not immediately necessary anymore. Even though telework has a number of advantages apart from business continuity during a disaster, these were not transferred to normal business operations.

California government agencies are doing all right in telework and emergency preparedness separately, although both situations could be improved. A combination of these two does exist partially on paper, but is not practiced. The important advantages telework has for the minimization of business interruption in a disaster situation are not exploited to their full extent.

The incorporation of telework in document emergency preparedness and its employment in the actual disaster situation should be established as an evaluation criterion for the effectiveness of the telework programs. California is a place very prone to disasters; it is therefore quite surprising that this opportunity as successful way of dealing with them is not used extensively already. This situation can and should be improved.

In order to control successfully business interruptions through telework, it is important that telework has been a part of normal work procedure before a disaster strikes. The full advantage can only be realized, if wide spread telework is implemented.

References

- BAKER, E.; HISE, G. VAN & LUKO, S. (1997), *Performance Hierarchy of Disaster Recovery Solutions*. [WWW-Document] Disaster Recovery Journal, 10 (3) Summer 1997, <http://www.drj.com/articles/sum97/bake.htm> (February 9, 2000)
- CALL CENTER QUARTERLY, *Disaster Strikes*, 3 (1) Winter 1999 [WWW-Document] <http://www.att.com/solutions/quarterly/CCQiii1/disaster.html> (August 31, 1999).
- DESANCTIS, G. & FULK, J. (1998), *Shaping Organization Form: Communication, Connection, and Community*. Walnut Creek, California: Altamira Press.
- DIEKMANN, A. (1998), *Empirische Sozialforschung*. Reinbek bei Hamburg: Rowohlt Taschenbuch Verlag GmbH.
- EUROPEAN COMMISSION (1999), *Status Report on European Telework. New Methods of Work 1999*. Brussels: Directorate-General Information Society.
- FBI BOMB DATA CENTER (1997), *General Information Bulletin 97-1. 1997 bombing incidents*. Washington, D.C.: U.S. Department of Justice, Federal Bureau of Investigation, Bomb Data Center.
- GAUDES, A. J. (1998), *Optimizing Mobility to Marginalize Interruption: A framework for facility management professionals that integrates virtual officing as a component of business continuity planning*. Unpublished master's thesis. University of Manitoba, Canada.
- GLANCY, C. & STAMIESZKIN, P. (1997), *How to Develop A Comprehensive Business Resumption Plan At A Large Organization*. [WWW-Document] In: *Disaster Recovery Journal*, 10 (3) Summer 1997, <http://www.drj.com/articles/sum97/glan.htm> (February 9, 2000)
- GORDON, P.; RICHARDSON, H. W.; DAVIS, B.; STEINS, C. & VASISHTH, A. (1995), *The Business Interruption Effects Of the Northridge Earthquake*. Los Angeles, California: Research Report No. LCRI-95-01, Lusk Center Research Institute, School of Urban and Regional Planning, University of Southern California.

HUWS, U. (1984), *The New Homeworkers*. London: Low Pay Unit. Low Pay Pamphlet No. 28.

IANNA, F. (1997), Disaster Recovery for Businesses. [WWW-Document] In: *Disaster Recovery Journal*, 10 (3) Summer 1997, <http://www.drj.com/articles/sum97/iann.htm> (February 9, 2000)

JACKSON, P. J. & WIELEN, J. M. VAN DER (1998), Introduction. Actors, approaches and agendas: from telecommuting to the virtual organisation. In: Jackson, P. J. & Wielen, J. M. van der (eds.) (1998), *Teleworking: International Perspectives*. London: Routledge.

JALA ASSOCIATES, INC. (1990), *The State of California Telecommuting Pilot Project. Final Report June 1990*. Los Angeles, CA: JALA Associates, Inc.

KORTE, W.B. & WYNNE, R. (1996), *Telework. Penetration, Potential and Practice in Europe*. Amsterdam: IOS Press.

LONG, M. H., *Business Interruption Risk Assessment: A Multi-Disciplinary Approach*. [WWW-Document] http://www.drj.com/new2dr/w3_029.htm (February 9, 2000)

MELODY, W. H. (1996). Toward a framework for designing information society policies. *Telecommunications Policy* 20 (4): 243-259.

NILLES, J. M. (1994), *Making Telecommuting Happen*. New York, New York: Van Nostrand Reinhold.

NILLES, J. M. (1998), *Managing Telework*. New York, New York: John Wiley & Sons, Inc.

PERRY, D. S. (1999), *Disaster Recovery*. [WWW-Document] <http://www.drj.com/Ezine/ezindex.html> (August 24, 1999).

PRATT, J. H. (1991a), *Travel Behavior Impacts of Telecommuting Following the San Francisco Earthquake: A Case Study*. Transportation Research Record No. 1305, Transportation Research Board, Washington, DC.

PRATT, J. H. (1991b), *Incorporating Portable Offices Into A Contingency Plan*. Contingency Journal, 21-23/September/October 1991.

QVORTRUP, L. (1998), From Teleworking to Networking. Definitions and trends. In: JACKSON, P. J. & WIELEN, J. M. VAN DER (eds.) (1998), *Teleworking: International Perspectives*. London: Routledge.

ROSSI & FREEMAN (1993), *Evaluation. A Systematic Approach*. Newbury Park, California: Sage.

SALANT, P. & DILLMAN, D.A. (1994), *How to Conduct Your Own Survey*. New York, New York: John Wiley & Sons.

SATO, K. & SPINKS, W. A. (1998), Telework and Crisis Management in Japan. In: JACKSON, P. J. & WIELEN, J. M. VAN DER (eds.) (1998), *Teleworking: International Perspectives*. London: Routledge.

SEIDMAN, I. (1998), *Interviewing as Qualitative Research*. New York, New York: Teachers College Press.

STRINGFIELD, W. H. (1996), *Emergency Planning and Management. Ensuring Your Company's Survival in the Event of a Disaster*. Rockville, Maryland: Government Institutes, Inc.

TOFT, B. & REYNOLDS, S. (1997), *Learning from Disasters: A Management Approach*. Leicester: Perpetuity Press Limited.

THE STATE OF CALIFORNIA TELECOMMUTING ADVISORY GROUP (1992), *Telecommuting Work Option. Information Guidelines and Model Policy*.

TOBIN, R. & TOBIN, R. (1997), *Emergency Planning on the Internet*. Government Institutes.

WOLD, G. H., *Disaster Recovery Planning Process*, [WWW-Document] http://www.drj.com/new2dr/w2_002.htm (February 9, 2000).

Appendix A - Sections 14200-14203, California Government Code, Chapter 3

STATE EMPLOYEE TELECOMMUTING PROGRAM

§ 14200. Telecommuting

As used in this chapter, "telecommuting" means the partial or total substitution of computers or telecommunication technologies, or both, for the commute to work by employees residing in California.

§ 14200.1.

(a) The Legislature finds and declares the following:

- (1) Telecommuting can be an important means to reduce air pollution and traffic congestion and to reduce the high costs of highway commuting.
 - (2) Telecommuting stimulates employee productivity while giving workers more flexibility and control over their lives.
- (b) It is the intent of the Legislature to encourage state agencies to adopt policies that encourage telecommuting by state employees.

§ 14201. Every state agency shall review its work operations to determine where in its organization telecommuting can be of practical benefit to the agency. On or before July 1, 1995, each agency shall develop and implement a telecommuting plan as part of its telecommuting program in work areas where telecommuting is identified as being both practical and beneficial to the organization. Agencies that participated in the experimental studies described in Section 15276 may continue and expand those telecommuting programs in accordance with the policy, procedures, and guidelines developed by the Department of General Services in conjunction with those participating agencies. Those agencies not having participated in the initial experimental studies described in Section 15276 may comply with the policy, procedures, and guidelines developed by the Department of General Services in conjunction with a multiagency group that participated in those studies.

§ 14202. Establishment of unit to oversee telecommuting programs; duties

The Department of General Services shall establish a unit for the purpose of overseeing telecommuting programs established pursuant to this chapter. This unit shall do all of the following:

- (a) Coordinate and facilitate the interagency exchange of information regarding the state's telecommuting program, and establish and lead a multiagency telecommuting advisory group for these purposes.
- (b) Develop and update policy, procedures, and guidelines to assist agencies in the planning and implementation of telecommuting programs.

(c) Assist state agencies in requesting the siting of satellite work stations and develop procedures to track the needs of agencies and identify potential office locations.

§ 14203. Evaluation of programs

Each state agency shall evaluate its telecommuting program. The Department of General Services shall establish criteria for evaluating the state's telecommuting program and recommend modifications, if necessary.

Appendix B – Survey Questionnaire

The following cover letter explained the purpose:

Subject: Telework and Disaster Recovery: A Survey of California Government Agencies

Your cooperation is requested in assisting us in developing and evaluating success criteria for the State Employee Telecommuting Program, pursuant to Section 114203, California Government Code. Your agency is among several that have been selected to participate in this effort.

Your answers to the enclosed questionnaire prepared for this task will be used by the Department of Personnel Administration in evaluating the real and potential value of the State Telecommuting / Telework Program as a reasonable response to state emergency preparedness and disaster recovery relating to floods, earthquakes, fires and civil disturbances.

Please have the person responsible for your organization's Operational Recovery Plan or Telecommuting/Telework Program complete and return the questionnaire to us. If the electronic way is preferred, it can be downloaded from the DPA web page <http://www.dpa.ca.gov> under 'Telework/Telecommuting' and can be returned via e-mail to Stefanie Normann <stefanienormann@dpa.ca.gov>. Your reply by November 30, 1999 will be appreciated. Please also provide the e-mail address of the person completing the questionnaire to Stefanie Normann at <stefanienormann@dpa.ca.gov>, or phone David Fleming at 916-327-9143.

Your cooperation in providing this information will be sincerely appreciated.

Telework and Disaster Recovery: A Survey of California Government Agencies



Please return the completed questionnaire
by Nov 30, 1999
by fax to 916-327-1886 or
by mail to
Telework Program, Department of Personnel Administration
1515 S Street, Suite 400 North, Sacramento, CA 95814.

1. **How many employees of your agency are teleworking in a formal written telework agreement?**

(Telework is an arrangement that permits employees to work in or near their homes for all or part of the workweek. It can mean working at a project site or in a client's office.

A formal telework agreement is written documentation of the arrangement.)

➡ *If none of your employees is teleworking in a formal written telework arrangement, please continue with question # 5.*

2. **What is the average number of days per week the teleworking employees in your agency telework?**

1 day []
2 days []
3 days []
4 days []
5 days []

3. **When was the formal telework option introduced (year, month)?**

4. **How many employees were teleworking at the start of the formal telework program?**

5. **How many employees of your agency are teleworking on an informal basis, without a formal written agreement?**

➡ *If none of your employees is teleworking on an informal basis, please continue with question # 10..*

6. **What is the average number of days per week the teleworking employees in your agency telework?**

1 day []
2 days []
3 days []
4 days []
5 days []

7. **When did teleworking on an informal basis start (month, year)?**

8. **How many employees were teleworking at the start of informal teleworking?**

9. Why is teleworking permitted without a formal written agreement?

- No necessity to formalize it []
Do not want to formalize it []
Do not know how to formalize it []
Other (Please explain) []

.....
.....
.....

10. What are the main reasons for teleworking in your agency?

(Please rank in order of importance with '1' being the most important, '2' the second most important, etc.)

- Space savings []
Improved recruitment/retention []
Productivity increases []
Improved customer service []
Greater flexibility for employees []
Risk management []
Other (Please explain) []

.....
.....
.....

11. What are the main reasons that discourage teleworking in your agency?

(Please rank in order of importance with '1' being the most important, '2' the second most important, etc.)

- Never thought about it []
Do not agree with the concept of telework []
None of the tasks within the jobs are location-independent []
Minority of the tasks within the jobs are location-independent []
Do not know how to start it []
Other (Please explain) []

.....
.....
.....

12. Does your agency have a Business Resumption Plan (BRP)?

Yes No
[] []

(A Business Resumption Plan covers specific Y2K requirements and is not required for all Agencies.)

13. If yes, is telework included in your BRP?

Yes No
[] []

14. Does your agency have a **Continuity Planning for Business (CPB)**? Yes No
 [] []
(Continuity Planning for Business is a document that focuses on Y2K at the moment and identifies risks specific to each Agency.)
15. **If yes**, is telework included in your CPB? Yes No
 [] []
16. Does your agency have an **Operational Recovery Plan (ORP)**? Yes No
 [] []
(The Operational Recovery Plan identifies a set of procedures to assure continued Agency operation in the event of a disaster.)
17. **If yes**, is telework included in your ORP? Yes No
 [] []
18. Did any event, emergency or disaster in the past 10 years Yes No
 [] []
 - make your building unusable, and/or
 - prevent or disable your employees from reaching their regular work site, and/or
 - impair in any other way physical access to and/or usage of the regular work site?

➡ If 'NO', please continue with question # 28.

19. **What kind** of event, emergency or disaster was this?

20. **When** did this emergency affect your agency (month, year)?
21. **How long** was the recovery process (days, months, years)?

22. What was the **damage** and the **limitation** you experienced?

23. Were employees of your agency teleworking, formally or informally, before the event affected your agency? Yes No
[] []

☞ If 'NO', please continue with question # 25.

24. If yes, how many?
formally informally

25. Were employees of your agency teleworking, formally or informally, immediately after and/or in recovery of the emergency? Yes No
[] []

☞ If 'NO', please continue with question # 28.

26. If yes, how many?
formally informally

27. Was this teleworking arrangement
continued []
expanded []
terminated []
after the recovery process was completed?

28. What is your name and your e-mail address?

.....

29. What is the name and address of your agency?

.....

.....

30. What is your present title and position?

.....

- 31. Do you have any comments you would like to share?
Please feel free to use extra paper, if necessary.**